Telecommunication Engineering

A-Thesis Track

The plan studying (33) Credits Hours as follows:

1-OBLIGATORY COURSES FOR SPECIALIZATION (9- credit hours)

No	code	course	LT	CR
1	EL501	English Technical Writing	3	0
2	ES501	Advanced Engineering Mathematics	3	3
3	EE 525	Random Variable and Stochastic Processes	3	3
4	EE 542	Digital Communication	3	3

2-ELECTIVE COURSES: Studying (18 credit hours) from the following

No	code	course	LT	CR
1	EE505	Digital Signal Processing	3	3
2	EE 544	Television Engineering	3	3
3	EE541	Electromagnetic Compatibility	3	3
3	EE 545	Radio Communication Engineering	3	3
4	EE 546	Microwave Devices	3	3
5	EE 547	Radar Engineering	3	3
6	EE 548	Multi-user Communication System	3	3
7	EE 549	Spread Spectrum communication	3	3
8	EE580	Satellite communication	3	3
9	EE585	Advanced antenna theory	3	3
10	EE590	Independent Study	3	3

3. Dissertation: (6) Credit hours <u>EE599</u>

B-Comprehensive Exam Track

The plan studying (33) Credits Hours as follows:

1-OBLIGATORY COURSES FOR SPECIALIZATION (15- credit hours

No	code	course	LT	CR
1	EL501	English Technical Writing	3	0
2	ES501	Advanced Engineering Mathematics	3	3
3	EE 525	Random Variable and Stochastic Processes	3	3
4	EE505	Digital Signal Processing	3	3
5	EE 542	Digital Communication	3	3
6	EE 545	Radio Communication Engineering	3	3

2- ELECTIVE COURSES: Studying (18 credit hours) from the following

No	code	course	LT	CR
3	EE541	Electromagnetic Compatibility	3	3
1	EE 544	Television Engineering	3	3
2	EE 546	Microwave Devices	3	3
3	EE 547	Radar Engineering	3	3
4	EE 548	Multi-user Communication System	3	3
5	EE 549	Spread Spectrum communication	3	3
6	EE580	Satellite communication	3	3
7	EE585	Advanced antenna theory	3	3
8	EE590	Independent Study	3	3

3- Passing Comprehensive Exam after successful completion of all courses

EE 505   Digital Signal Processing

Classification of discrete-time signals and systems. Basic and lattice structures, Finite-word length effects. Discrete Fourier Transform and its efficient implementations. Introduction to spectral analysis. FIR and IIR filter design techniques: Windowing techniques, Analog-to-Digital transformation techniques, Computer-aided design techniques.

EE 525   Random Variable and Stochastic Processes

Probability, Definition and axioms, random experiment, probability. Conditional probability, Bayes theorem. combined experiment.Random Variable
One dimensional random variable, definition, examples, moments, characteristics function, trains of random variable, conditional characteristics N-dimensional random variable. Joint characteristic correlation, covariance, independence. Outcome, borefield, events, Independence. Extension to Stochastic Processes Notion of random function, statistics, stochastic processes, stationary, periodicity, second order stochastic processes, sampling, discrete random processes. Examples of stochastic processes Poisson process, telegraph process, normal process, white noise and its importance, Markov process, Applications, modulation: AM, FM, P AM. Mean square estimation: predication, Filtering spectral analysis (MAX. Entro*py method*).

EE 541 Electromagnetic Compatibility

Electromagnetic compatibility in radio communication systems. Electromagnetic compatibility system analysis: the coupling mechanism between the radio terminals, interference system analysis procedures.Electric strength and thermal fields distributions in HVDC systems. Over voltages in power systems: factors influencing over voltages parameters (grid features, lightning and protection against over voltages). Standardized methods of testing and measurement in high voltage. Generation of high voltages: DC, AC and impulse voltage testing of insulation systems. Testing procedures, conditions of testing, DC testing of cables and capacitors, lightning and corona in power system, Surge impulse voltage testing: lightning and switching voltage, chopped impulses.

EE 542 Digital Communication

Review of probability and statistic processes. Basic concepts of digital communication: mathematical representation and design of digital signals, source coding, digital modulation and demodulation techniques, mathematical models of physical channels. Advanced topics in system design for transmission of information over band-limited channel (telephony), fading multiply channels (radio) and spread spectrum signals.

EE 543 Telephony and telegraphic

Telephone set. Principles of automatic exchange. Digital exchanges queuing theory M/M/r. Telegraphic and trucking. Telegraphy, teletext, video phones, faximile.

EE 544 Television Engineering

Principles of B/W TV systems-transmission and reception. Detailed discussion of functional diagram of BIW TV receiver. Principles of CT systems-transmission and reception. Detailed discussion of functional diagram of ctv receiver. Designing examples of selected TV circuits.

EE 545 Radio communication engineering

Principles of radio communication: radio waves, modulation techniques, transmission techniques and reception techniques. Introduction to VLF, LF, MF, HF, microwave and satellite communication.

EE 585 Advanced antenna theory

Properties and characteristics of antennas. Polynomial representation of linear arrays. Pattern synthesis. Chebyshev array distributions. Thin linear antennas. Microstrip radiators and arrays. Huygen's principle. Radiation from apertures. Reflector type antennas. Frequency independent antennas. Reciprocity theorem and receiving antennas. Radar antennas. Antenna measurements.

EE 546 Microwave Devices

An overview of microwave integrated circuits (MIC). Hybrid and monolithic MIC. Analysis of microstrip lines. Slot lines and coplanar waveguides. Coupled microstrip and directional couplers. Microstrip circuit design: couplers, Hybrids and filters. Lumped elements. Ferrite components. Active devices for MIC: MESFET, Gunn diode, avalanche diode, Schottky-barrier diode and PIN diode. MIC modules: oscillators, amplifiers, mixers and phase shifters. TR modules.

EE 672 Satellite Communications

Introduction to satellite communication systems. Satellite orbits. The satellite channel. Satellite links. Earth stations. Modulation and multiplexing. Digital modulation. Multiple access and demand assignment. Satellite cross links. VSAT and mobile satellite systems.